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IN THE APPLICATION

OF

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FOR AN

AUTOMATIC PNEUMATIC PUMP

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AUTOMATIC PNEUMATIC PUMP

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

The present invention generally relates to pumps. More specifically, the present invention is drawn to a pneumatically-operated fluid pump.

2. DESCRIPTION OF THE RELATED ART

Environmental concerns have dictated that fluid-contaminated sites must be cleaned. The contaminated sites may include land rig cellars and pits that are filled with slush and oilfield mud. Federal and state laws often mandate that this contaminated, liquid material be removed for destruction. Removal of the contaminated material requires the use of a sturdy, reliable liquid pump. A variety of pumps have been employed in the past for removing liquid contaminates. For example, U.S. Patents numbered 5,451,144 (French), 5,662,460 (Modesitt), 5,944,490 (Breslin), 6,224,343 B1 (Newcomer) and 5,004,405 (Breslin). Disclose pneumatically operated pumps utilized to pump fluids. All of the disclosed pumps employ relatively complicated bellows and/or linkage systems, which systems are subject to operational wear and tear and require maintenance.

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U.S. Patents numbered 4,257,751 (Kofahl) and 5,141,404 (Newcomer) show down hole pumps adapted for placement in a well bore. The pumps include coiled springs that will lose resiliency after repeated use.

U.S. Patent numbered 6,027,314 (Breslin) discloses a submerged pump that relies on plural valves to accomplish its function.

None of the above inventions and patents, taken either singly or in combination, is seen to disclose a pneumatically operated pump as will subsequently be described and claimed in the instant invention.

SUMMARY OF THE INVENTION

The present invention is an automatic, pneumatic pump having a chamber that is gravity-fed through a top opening and through a vertical tube with waste liquid. A buoyant plunger sits on air inlet nipple, which nipple is located at the bottom of the chamber. Liquid entering the chamber causes the plunger to float and thereby to be unseated from the air inlet nipple. The plunger rises in the tube until it closes the top opening. Pressurized air enters the chamber and forces the waste liquid out through a discharge line. When all air and liquid have been discharged, the plunger falls to the bottom of the tube and reseats on the air inlet nipple so that the cycle can start again.

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Accordingly, it is a principal object of the invention to provide a pneumatic pump, which pump is adapted to pump contaminated wastes out of land rig cellars and pits.

It is another object of the invention to provide a pneumatic pump, which pump is automatically operated.

It is a further object of the invention to provide a pneumatic pump, which pump is maintenance free.

Still another object of the invention is to provide a pneumatic pump, which pump requires only one moving part.

It is an object of the invention to provide improved elements and arrangements thereof for the purposes described which are inexpensive, dependable and fully effective in accomplishing their intended purposes.

These and other objects of the present invention will become readily apparent upon further review of the following specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an environmental view of an automatic pneumatic pump according to the present invention with the plunger seated on the air inlet stem.

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Fig. 2 is an environmental view of an automatic pneumatic pump according to the present invention with the plunger afloat and unseated from the air inlet stem.

Fig. 3 is an exploded view of an automatic pneumatic pump according to the present invention.

Fig. 4 is a plan view of a jet nipple according to the present invention.

Fig. 5 is a bottom view of a head plate gasket according to the present invention.

Similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Attention is directed to Figs. 1-3 wherein the pump of the present invention is generally indicated at **10**. Pump **10** comprises an outer tank **12** made of metallic material, preferably iron or stainless steel, and enclosing a chamber **12a**. Tank **12** is provided with handle members **14** welded or suitably attached thereto. A tubular member **16** is enclosed within tank **12** and sealed therein. Tube **16 is** open at both its upper end **16a** and its lower end **16b**. Upper end **16a** extends through the top of tank **12** and is sealed therewith. A bottom wall **13** seals chamber **12a** in a water- tight manner. A head seat **18** is attached to end **16a**. Filter member **20** is positioned over the open upper end of tubular

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member **16** to prevent large pieces of debris from entering the pump. Head plate gasket **18a** and head plate **18b** complete the construction of the upper end. A floatable plunger **22** is disposed within tubular member **16** and is free to move vertically therein. A compressed air line **24** is provided with a removable jet outlet nipple **24a** that opens into the lower end **16b** of tube **16**. A portion of air line **24** is disposed on the bottom wall **13** of tank **12**. At its exterior end air line **24** is connected to a source of compressed air (not shown). A liquid discharge line **26** opens into chamber **12a** adjacent bottom wall **13**. As shown in Fig. 1, plunger **22** is seated on jet air outlet nipple **24a** to prevent air from entering tube **16**. Liquid **L** to be pumped enters tube **16** via open end **16a**. The rising liquid **L** causes the plunger to be buoyant enough such that the air pressure pushes the plunger upwardly toward end **16a** (Fig. 2). The top of plunger **22** is provided with a gasket or the like **23** for sealing engagement with head seat **18**. Head plate gasket **18a** is provided with a beveled surface **18c** on its under side (Fig. 5) so that the top of the plunger can form a tight seal therewith. This arrangement will allow the plunger to prevent the flow of liquid into tube **16** when the plunger has risen to the top of member **16**. When the plunger begins to move upwardly it becomes disengaged from nipple **24a** thereby allowing compressed air to enter tube **16** and chamber **12a**.

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The continued entry of compressed air forces the liquid through discharge line **26**. When all air and liquid has been discharged, plunger **22** falls and is reseated on nipple **24a** to begin another pumping cycle.

As best seen in Fig. 3, plunger **22** is a generally cylindrical member having an open bottom. Plunger **22** is made of iron. A double-walled configuration provides a sealed chamber **25** between the outer and inner walls. A sealable opening **27** is disposed in the outer wall. This arrangement permits a user to inject a fluid into chamber **25** to increase the weight of the plunger, if necessary, for more efficient pumping. A sealing plug **29** is provided to engage outlet **24a** when the plunger is seated thereon. Plug **29** is fabricated from a pliable material such as rubber. As best seen in Fig. 4 jet outlet nipple **24a** is threaded at its lower end so that it may be removably inserted into air line **24**. Nipple **24a** is fabricated with a conical seat **24c** to receive plug **29** in sealing engagement.

It is to be understood that the present invention is not limited to the embodiment described above, but encompasses any and all embodiments within the scope of the following claims.

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